VOL. IV. NO. 200.

GARDEN AND FOREST

A JOURNAL OF HORTICULTURE LANDSCAPE ART AND FORESTRY

DECEMBER 23 1891

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Among the contents of next week's issue (No. 201) will be the following articles:

The Old Age of the Year.
EDITORIAL.

Notes on Strawberries.
By PROFESSOR E. S. GOFF.

Spiræa discolor, var. ariæfolia.
(With illustration.)
By J. G. JACK.

New Orchids.
By J. A. ROLFE.

The paper will contain an illustration of Spiræa discolor, var. ariæfolia, from a photograph.

GARDEN AND FOREST.

PUBLISHED WEEKLY BY

THE GARDEN AND FOREST PUBLISHING CO.

OFFICE: TRIBUNE BUILDING, NEW YORK.

Conducted by . . . . . Professor C. S. SARGENT.

ENTERED AS SECOND-CLASS MATTER AT THE POST OFFICE AT NEW YORK, N. Y.

NEW YORK, WEDNESDAY, DECEMBER 23, 1891.

TABLE OF CONTENTS.

PAGE.

EDITORIAL ARTICLES:—Hemlocks in Winter. (With figure) 601
Shaw School of Botany, in Saint Louis 601
New England Parks . . . . . *Mrs. J. H. Robbins.* 602
Notes of a Summer Journey in Europe.—II . . . . . *J. G. Jack.* 603
The Weeds of California.—VI . . . . . *Professor E. W. Hilgard.* 604
PLANT NOTES:—Cypripedium reticulatum. (With figures.) . . . . . *A. D.* 605
CULTURAL DEPARTMENT:—Sowing Seed . . . . . *J. N. Gerard.* 605
Rose Notes . . . . . *W. H. Taplin.* 606
Better Begonias Wanted . . . . . *W. E. Endicott.* 606
Gall-worms Injuring the Roses . . . . . *Professor Byron D. Halsted.* 608
Notes from the Harvard Botanic Garden . . . . . *M. Barker.* 608
Calanthes . . . . . *W. S.* 609
THE FOREST:—The Subjection of Torrents by Reforestation of Mountains.—III. *M. P. Demontzey.* 609
CORRESPONDENCE:—Botanical Exhibition of the Appalachian Club, *Edward L. Rand.* 610
The Acorn Crop near Chicago . . . . . *E. J. Hill.* 610
Uncommon Varieties of Apples . . . . . *N. D.* 611
RECENT PUBLICATIONS 611
NOTES 611
ILLUSTRATIONS:—Cypripedium reticulatum. The Plant, Fig. 95 605
Cypripedium reticulatum. The Flower, Fig. 96 605
A Hemlock Grove in Winter, Fig. 97 607

Hemlocks in Winter.

IN our northern climate, with its long and often rigorous winters, the sight of evergreens is a comfort and delight. Their soft green masses seem to mitigate the severity of the season, and to temper the bitter blast. This the aborigines well understood, and in the depths of the forest the Indian built his winter camp, securely sheltered from the searching winds, which are the unendurable part of that tempestuous portion of the year.

Goodly is an assemblage of Firs and Spruces when skies lower and tempests howl, comfortable the aspect of a Pine wood, with its furry branches and brown carpet, when the bare twigs of deciduous trees are shivering in the northwest wind; but more impressive than all is the sight of a group, or forest, of Hemlocks, such as is depicted on page 607, with their bending boughs laden with snow, and their graceful forms emphasized by their regal border of ermine.

Growing, as they best love to grow, on a rocky northern slope, their majestic height is enhanced by the elevation on which they stand; their columnar trunks catch the light from above upon their snow-besprinkled bark, till the whole forest seems a Gothic cathedral, marble-roofed and pillared, with wild fret-work and intricate design of shaft and capital, cornice and rafter, buttress and corbel, sculptured like a shrine with fantastic forms, and built into a quaint wonderful series of aisle and nave, chapel and sanctuary.

To walk here gives a strange and solemn delight; the gray rocks take on grotesque forms in their white sheathing, the ground is like a mosaic floor beneath the feet, the winter birds chatter in the branches overhead, the great trunks, with their rough bark, show a rich hue amid all this whiteness. A snow-shower greets the traveler from the light branches stirred by the approach of man as he advances through the solitary wood. No wind reaches the sheltered region, but in the high snow-laden tops there is a murmur, the voice of the forest, the diapason of creaking bough, and sigh of stirring foliage shaking off its burden. New and lovely forms greet the beholder as he strays in this trackless wilderness, where the Indian of yore found protection and warmth for his wigwam built of the red-brown bark. The thought strays back to that time before the white man penetrated these wilds to drive the sachem and the squaw from their happy hunting-grounds, and he would gladly give a voice to the old trees to tell their story and recall the past, singing in runic rhyme some strange, wild legend of an older savage day. What more mysterious than the forest? What voice more vaguely impressive than its confused complaint? What poet may catch the echo of this melody and weave it into verse? To wander in a Hemlock wood is to commune with Nature, to listen to an unknown tongue, to struggle with the secret of the unspeaking trees, which suggest questions forever to man, but never reply, nor share with him their experience.

A single Hemlock, standing alone, with every curving line ridged with snow, through which the feathery green shines darkly, is a fair sight, a Christmas emblem, a tree of beauty. When the sun shines and the snow melts, a faint aromatic fragrance emanates from the dripping foliage, as if the tree were burning incense. This delicate perfume, full of soft suggestion, completes the charm of this wonderful tree, precious alike for nobleness of shaft and grace of branch and leafage, seeming forever to associate it in one's mind with that dear holiday of childhood, which is the solemn festival of maturity.

For the Hemlock is, above all, the Christmas-tree. Its perfume, whenever we inhale it, brings to our minds, not only a vision of the green wood, but a thought of dim and quiet churches wreathed with its boughs, of a deep chancel embowered in its branches, of joyous hymns from white-robed choristers, of the great angelic chorus,

Gloria in Excelsis Domino,

with which Christmas Day first dawned upon a waiting earth, and which echoes still in solemn chant of earthly voices from cloister and cathedral, from chapel and fireside, as year by year the happy day returns, on which we wreathe about the Christmas altar and the Christmas hearth the Hemlock-bough to give forth the sweet incense of its fragrance.

Then a vision of joyous little ones dancing around its gayly lighted form succeeds the solemn suggestion of its holy service, and our careless youth returns in memory, cheery and full of hope, or in maturer age we rejoice in the pleasure of our children and our grandchildren, as we gaze indulgently upon their frolicsome glee around this bearer of precious burdens.

So must this stately and beautiful Hemlock ever come near to our hearts, twined as it is with thoughts of praise and of generous giving; and with its undying verdure, its wide-spread, kindly shelter, its solemn loveliness, its breath of praise, it is a fitting emblem of the season with which it must ever be associated in our thoughts—the blessed Christmas-tide.

A FEW weeks ago we published the announcement of Professor Trelease concerning the examination of candidates for garden pupils at the Shaw School of Botany, in Saint Louis. It will be remembered that there are six scholarships in this institution, where young men can receive theoretical instruction in botany, horticulture, economic entomology, and enough of land-surveying and book-keeping to equip one to take charge of a large estate. The aim, however, of these scholarships is not to make botanists or entomologists, but gardeners; and as the only way to learn garden practice is by the practice of gardening, these young men will be employed in the work of the different parts of the establishment and receive pay for the same, besides having comfortable lodgings near at hand and free tuition. The pupil is expected here to learn the practice of small-fruit culture, orchard culture, forestry,

vegetable gardening, landscape gardening, etc., and therefore it is entirely distinct in its purpose from the horticultural courses established in the various state agricultural colleges.

We have lately received several letters to confirm us in the opinion that young men who now take a thorough training in horticulture, either at this Shaw School or under the instruction of skilled gardeners and the growers of choice plants, can easily find remunerative employment. There is an increasing demand for men who understand the cultivation of greenhouse-plants and who are familiar with the care of outdoor gardens. Besides this, seedsmen and commercial growers of high-class plants find it hard to secure men with sufficient practical knowledge to enable them to be efficient salesmen either of new introductions or of well-known plants. One of the letters to which we have referred states that there is general complaint among large dealers of the difficulty in securing thoroughly posted and capable salesmen; and while it is true that many of the gardeners in charge of greenhouses and grounds in this country are as good as can be found elsewhere in the world, there are others who have not sufficient knowledge or ambition to take the proper care of a fine collection of plants; and the owners of such plants are, therefore, discouraged from buying more or taking such an interest in gardening as they otherwise would. It is a well-known truth that there are comparatively few good gardeners or salesmen who are American-born. The greater number of the leading men who fill these positions have received their training in Great Britain, France, Germany, Belgium, Sweden or some other foreign country. Certainly Americans have as much natural aptitude for this work as have men of any other nationality. Indeed, some of the most skillful propagators and enterprising growers in the country are Americans. Why should not more of our young men prepare themselves for labor in this promising and useful field?

New England Parks.

DEERING'S WOODS AND THE PROMENADES, PORTLAND, MAINE.

WHOEVER has read Longfellow's "My Lost Youth" must have desired, at some time or other, to see "the shadows of Deering's Woods" for himself—those woods in which the gentle poet played when a child, and which he has embalmed in one of the most exquisite of his poems.

It is the privilege of the poet to thus secure immortality to some spot dear to his heart, and to make the name of that unseen region a household word even in distant lands. The steep brow of the mighty Hellvellyn will ever be a feature in the mind's landscape beside the Dowie Dens o' Yarrow and the Banks o' Doon. How many pilgrimages have Scott and Burns caused to view the ruins of Melrose or of Alloway's Auld Haunted Kirk? Is not all Scotland pictured to us in the ringing verse of Scott, till every loch and glen are dear to us, and Ben Nevis and Ben Lomond, Stirling Castle and its "winding river, twined in links of silver light," are as familiar to our imagination as the New England coast?

The Rhine—the poetical watchword of two nations—what wreaths of verse and legend hallow its hills and vineyards! How the yellow Tiber, with its tumbling flood, is a clear vision to the man who never hopes to see the "City of the Soul"; while the peaks and streams of ancient unseen countries live for us in the undying strains of the bards who have sung them, till Scamander and Simois, Olympus and the distant Caucusus, Avernus and the Stygian Grot, even the lone Corasmian shore, have a reality to our minds that no geography or history could impart, and dwell forever in our memories, embalmed in one sweet sonorous line.

What Washington Irving has done for the Hudson, what Whittier and Emerson have done for Monadnock and Chocorua, Longfellow has done for Portland—his native city—and for its pleasant woods. Forever in his verse will linger "the beautiful town that is seated by the sea," while we

> —can see the shadowy lines of its trees,
> And catch in sudden gleams
> The sheen of the far-surrounding seas,
> And islands that were the Hesperides
> Of all my boyish dreams.

Nor is it merely a poetic license to call the chief city of Maine beautiful; for whether approached by sea or land it has an impressive aspect, girt about, as it is, with waters, and overshadowed by fine Elms. Yet its full beauty cannot be felt until you explore the high peninsula on which it stands, really an island, since a bridge is its connection with the mainland, and see the continual rise from the encircling bay to the lofty centre, with shady streets ever climbing or descending hills, while from the high upper windows of many houses, far-away views of sea or mountain gladden the dweller in that favored town.

For some reason I had falsely fancied that Deering's Woods were to be found somewhere upon those heights

> o'erlooking the tranquil bay,

where sleep the dead sailors who fell in the famous sea-fight between the Shannon and the Chesapeake in the war of 1812; so that it was with surprise I discovered the old grove in a valley near the water, hard beset by screaming engines and partly belted by iron rails. I was disappointed, too, in the extent of this classic ground; for, though there are sixty-six acres in the city reservation, not all of it is covered with trees, and some of it is in a rough, unfinished condition.

The woods which were presented by the Deering family to the town in 1879 cover a space about as large as Boston Common, and consist almost entirely of Oaks, venerable with age and russet with the touch of autumn when I saw them. Drives wind in and out among the antique trees, under which the turf is fresh and green. The underbrush is all cleared away, and in the centre is a natural pond of pleasing contours, which is a beautiful feature of this easily accessible pleasure-ground.

It is to be hoped that the city will acquire a certain slope beyond the railroad-cut, which could easily be bridged over to connect it with the grounds; and I understand that more land contiguous is soon to be purchased to give greater importance to the proportions of the little park—for park the local newspapers persist in calling it, though far more preferable and hallowed is the homely name of Deering's Woods, given to it by the poet, or that other appellation by which it is still known to Portland boys—Deering's Oaks. It is neither large nor imposing enough to be properly called a park, and the old name fits it perfectly, while it seems to me that somewhere about its gates might be engraved the quotation from the well-known poem, which makes it classic ground:

> And Deering's Woods are fresh and fair,
> And with joy that is almost pain,
> My heart goes back to wander there,
> And among the scenes of the days that were,
> I find my lost youth again.
> And that strange and beautiful song
> The groves are repeating it still,
> "A boy's will is the wind's will,
> And the thoughts of youth are long, long thoughts."

So associated is her poet son with the city of his birth, that, as one walks under the overarching trees, it is pleasant to come upon Mr. Simmons' seated statue of Longfellow, at the shaded junction of several avenues, looking down "those well-known streets" which he as sweetly commemorates in his verse as "the black wharves and the slips," the "bulwarks by the shore," and that

> breezy dome of groves

which was the occasion of my pilgrimage to the dear old town, which cherishes his memory by preserving the spot he so highly honored with the undying tribute of song, as a perpetual playground for its children.

Even more important as a breathing-space to the sea-girt city is the fine system of promenades with which she has crowned her heights—wide, smooth drive-ways, from which the harbor is grandly commanded. Here on the eastern promenade you skirt ancient earthworks, and come out upon the esplanade where are the ruins of Fort Sumner. From this point you look upon the Back Bay and the city climbing its promontory, while due east is a great harbor with a peaceful opposite shore, and islands dotted with summer homes, and a view of Cape Elizabeth, which has many villas along its windy and sea-smitten coast, that are a favorite resort of Portland people. This high and breezy avenue is shaded by tall trees much dejected by constant exposure to northern blasts, but the outlook upon bay and land is imposing. This system of drives encircles the summit of the peninsula, which, from its lofty elevation, commands a great extent of country; but the western view is the finest of all.

Upon the western promenade front some of the best Portland houses, and perched on the side hill is the Maine General

Hospital, a large, admirably situated building, from which the patients must enjoy a noble sight, for here the eye wanders over a vast extent of level country, relieved by hills and distant homes, through which meanders the River Fore. In the far middle distance uprise the mountainous hills of Oxford County, blue and impressive, while in the remotest background, half-hidden by shifting clouds, loom up the peaks of the White Mountains of New Hampshire, Mount Washington clearly relieved with its unmistakable purple profile against a pale gray sky, and now and then veiling its head completely in drifting clouds. From November until May these peaks of a clear evening can be seen in white silhouette against the golden sky as the traveler leaves Portland by train or boat.

Such a champaign, diversified with near glimpses of the bay and the winding river which empties into it, with that vast hundred-mile stretch terminating in mountain-peaks, is a wonderful thing to look out upon from a busy and populous city. But there is a drawback to this fine boulevard which should not be permitted to exist.

Unfortunately, the steeply descending hill-side, clothed with scattered Pines, that intervenes between the Western Promenade and its great outlook, has not yet been acquired by the city, though the opportunity has been afforded by the heirs of the J. B. Brown estate to exchange this land for other lots lying in a different part of the town.

When I recognize how much public spirit is shown by rich men in Massachusetts towns; when I see the great gifts of land for parks made in Springfield, in Lynn, in Worcester, and even in little Plymouth, I cannot help hoping that a similar generosity may be found in Portland, and that like munificent gifts may be made to it by some of the inhabitants. But, failing this, it seems a lack of foresight in any town to relinquish such an opportunity as this for securing to its dwellers for all time so magnificent an outlook as that from the Western Promenade. Such a mistake would be forever regretted, until some day, at enormous expense, the city would see fit to repair its error by resuming control of the property and destroying the intervening buildings. The town has, I understand, but a limited time in which to come to a decision; but a city which has been, heretofore, willing to pay between six and seven thousand dollars a year for the construction and maintenance of its park system, cannot afford to draw the purse-strings between it and one of the finest views in the whole beautiful state of Maine.

So far Portland has been wise and generous in her outlay, and, with all the wealth of that thriving town to call on, it is not to be believed that she will be wanting to so great an occasion.

Hingham, Mass. *M. C. Robbins.*

Notes of a Summer Journey in Europe.—II.

NO doubt, Geneva is indebted for much of her wealth of American and other foreign trees and shrubs to the influence and work of her illustrious botanists, the De Candolles, who have always made the city their chief home. The Botanic Garden here was planned and arranged early in the century, by the first illustrious botanical member of the De Candolle family, according to what is known as the De Candollean system of classification, and although the garden is not large it is quite worth a visit from any botanist or horticulturist. It occupies a sheltered situation almost in the heart of the city, and is divided into a number of sections, each enclosed by low fences and intersected by numerous paths. On account of its limited area, there is not a great deal in it of much interest to an arboriculturist or dendrologist; in fact, the most interesting trees, about thirty-five in number, comprising twenty-five species, are crowded into six rows, covering a piece of ground less than two hundred feet long and sixty feet wide. This group is not within the systematically arranged enclosures, and it is said to have been planted in the second decade of the present century. Here, among others, are two large Gingko-trees, labeled as staminate and pistillate; a Cedar of Lebanon, with a trunk about twenty-eight inches in diameter at three or four feet from the ground, and a specimen of *Zelkowa crenata*, with a smooth trunk two feet in diameter. While this tree has very much the habit of some Elms, to which family it belongs, the bark looks something like that of the Plane-tree (Platanus), or it may be said to be even smoother, the old bark scaling off in comparatively thin plates. In a corner of the garden is a Paulownia, with the largest trunk of any tree in it, while a specimen of our Cucumber-tree (*Magnolia acuminata*) is the best and almost only representative of its genus.

The herbaceous collection is a fair representative one, in good condition and apparently well labeled. The labels mostly in use here are made of thick, heavy zinc, and are either tied to the plants or fastened to stout iron rods. The names are cut into the metal by an acid which is applied after the zinc has been covered with engravers' wax and the desired name written through it. The name thus eaten out by the action of the acid is afterward filled in with black paint, making a fairly indelible record, and one that is easily legible at close quarters. It is, however, rather a laborious and slow method of getting an ordinary written label. As in most Swiss and German collections, one of the chief prides of the garden consists in the rockeries, or collections of alpine plants, as they are called, although they are by no means limited to plants of the mountains. The rockeries here are arranged in a rather formal and inartistic way, comprising several symmetrical piles of stones and soil. The plants, however, were in a flourishing condition and showed good care. At the time of my visit (July 20th) most of the alpine plants had long since passed their flowering stage, but a few were still conspicuous, chief among them being Campanulas, Poppies, Rock-roses, Gentians, Sedums, various species of Dianthus, Statice, etc. High up in the cooler, moister atmosphere of the mountain-slopes many species were still blooming freely, while in the garden they had passed on to the fruiting stage.

Quite as interesting, in a way, as the Botanic Garden, and a place well deserving of a visit by any enthusiast in the study of alpine floras, and particularly the flora of the Swiss Alps, is the Jardin Alpin d'Acclimatation. This establishment was started in 1884, under the patronage of the Swiss "Association pour la Protection des Plantes," an organization started a few years previously.

The object of the association itself is to save from destruction the beautiful and rare native plants of Switzerland, many of which were so fast becoming exterminated by botanists, tourists, foreign plant-collectors, and, worst of all, by the native population, who had found a remunerative pursuit, first in the sale of the flowers, and then in the collection and sale of the plants, which were dug or torn up by hundreds and thousands. Among the methods of accomplishing the desired end, as stated in the articles of organization, are the following: By the example of its members; by issuing popular publications for the purpose of educating the public in the manner of raising and cultivating these alpine plants; by appeal to the civil authorities, and by encouraging the culture of the plants by regular horticulturists and others, so that they may become common.

The headquarters of the association is at Geneva, and branch societies are established wherever a sufficient number of persons can be found interested in the subject. An annual fee of about forty cents (two francs) is charged, and citizens of any country are eligible as members. The association publishes periodical bulletins and also issues catalogues of seeds and plants. The establishment of the garden is intended to assist amateurs and others in obtaining at a very small cost the seeds of alpine plants or plants raised from seed. As plants thus raised can be depended on to thrive if given proper conditions, it is the hope of the society that the incentive to tear the wild plants from their native soil may be greatly lessened; because, besides leaving the valleys, mountain-slopes and rocks denuded of their beautiful flowers, it is well known that only a very small percentage of these ruthlessly torn up plants ever live to bloom or get adapted to their new homes. An instance of extermination may be mentioned in the case of *Potentilla fruticosa*, which, though found all around the northern hemisphere, and once common in Switzerland, is not now found within the limits of the country, the last of it having disappeared within a few years.

The plan of the association seems a good one, and much good can be accomplished through its garden if it is efficiently conducted and its existence and aim become well known. At present the garden is small, and so are the means at command for conducting it, and no doubt much of the interest manifested and the success of the undertakings thus far is due to the enthusiasm of M. H. Correvon, the president of the association and the director of the garden. From the garden the true plant-lover or the mere souvenir-hunter may obtain good healthy pot-grown plants of the much sought for Edelweiss, with directions as to its culture, and also of the Alpine Rose or Rhododendron, of the Anemones, Cyclamens and innumerable other plants which contribute to make Switzerland so attractive to the traveler. The catalogue, however, will be found to contain the names of many plants not natives of Switzerland, as well as some which are not strictly alpine.

Among other objects of the association is the establishment of gardens or reservations in various parts of the high Alps,

where the native plants can be grown and protected in their natural habitat, with congenial climate and surroundings. One of these stations, started two years ago, is called the "Linnæa," and is situated high up at Bourg-Saint-Pierre, on the Grand Saint Bernard route.

The free use of trees for decorative purposes, apparently, prevails as much in Switzerland as with us. During my stay in Geneva the city was gayly decorated in honor of a congress of athletic societies, and, besides the usual display of flags, bunting, etc., immense quantities of greenery were used, being brought from the surrounding country and neighboring mountains. Both branches and young trees of the native Balsam Fir were used in great quantities, also some Norway Spruce and Swiss Pine, while the native Ivy (*Hedera Helix*) and the Box were the chief materials used in making up festoons and other trimmings.

Arnold Arboretum. *J. G. Jack.*

The Weeds of California.—VI.

THE *Convolvulaceæ* supply only two obnoxious members, one native, *C. Californicus*, and the European *C. Arvensis*. These are not hurtful as "bindweeds," but simply on account of obstinately holding their ground against culture plants by dint of their long root-stocks that penetrate the ground to great depths, and which it is impossible to kill otherwise than by exhausting them, keeping the persistently reappearing tufts of foliage constantly cut during at least one season. The native species, which is erect without creeping stems, is especially hard to subdue in the "black prairie" or adobe soils of the Coast ranges, and its pretty white flowers adorn many an abandoned orchard in the Bay country. The "convolvulus" is the most dreaded of the perennial weeds.

Cuscuta trifolii is naturally a much-dreaded pest in a country in which Alfalfa is so important; and it annually makes its appearance here and there, but is promptly checked by the simple expedient of close-pasturing for at least one season. Alfalfa-seed is usually required by the purchaser to be warranted "free from Dodder."

Of the *Solanaceæ*, *Solanum nigrum* appears as a weed in waste places or fields without being troublesome. The *Datura Stramonium* has been introduced, but makes little headway, and is rare, while the native *D. meteloides* maintains itself obstinately against cultivation in the great valley and in south California, taking the place of the "Jamestown weed." Its range is nearly co-extensive with that of one of the native tobaccos—*Nicotiana attenuata*—whose viscous stems and foliage combine with an unpleasant odor to render it objectionable in the fields it invades.

Of the *Scrophulariaceæ*, the only weedy accession from the outside is an occasional occurrence of *Veronica peregrina*. *Scrophularia Californica* is locally somewhat troublesome; *Mimulus lyratus* is an obstinate but hardly noxious guest on the black lands of the Bay region and elsewhere. The most troublesome member of the family is *Orthocarpus purpurescens*, which locally not only disputes the ground with grain in the Coast ranges, but must be strongly suspected of adding injury by semi-parasitism, etiolating the remnant of grain-stalks. The same must be suspected as regards several others of the same genus that are frequent among the grain, and in pastures in California, as well as of *O. campestris* of Oregon and Washington.

The cosmopolitan Brunella, though occurring in the mountain-pastures of northern California, obtains no foothold south of the Oregon line. *Stachys bullata* is locally troublesome in the Coast-range valleys; the intensely scented Trichostema (Camphor-weed) maintains itself in the cultivated fields of the warmer parts of the state as on its original ground, defying heat and drought, and playing the part of a "Tar-weed" very successfully. But no other Labiates can be counted as weeds.

The *Verbenaceæ* are represented only by *V. officinalis*, which, in the irrigated lands of the great valley and lower foot-hills, attains a vigorous development.

Of the *Plantagineæ*, *P. major* and *P. mollis* give some trouble in lawns and irrigated grounds, but cannot be considered generally troublesome. It is quite otherwise with *P. lanceolata*, which in company with *Setaria glauca* is the most formidable enemy of irrigated grounds and pastures in the foothills of the Sierra, and more or less in the adjacent portions of the Sacramento Valley. The Plantago frequently shares the ground evenly with the grain, and in company with the Setaria forms steadily increasing patches in the Alfalfa fields, until the whole ground is taken. Such ground is difficult to reclaim from these weeds so long as field-crops are grown.

Urtica holoserica, the tall, stout native Nettle, makes itself disagreeably conspicuous in low grounds; while *Urtica urens* is a common invader of cultivated grounds all over the state.

Of the *Euphorbiaceæ*, it is chiefly the decumbent tribe that represents the Euphorbias proper in the fields, notably *E. Serpyllifolia* of the east, and *E. albomarginata* and *E. ocellata* as natives. All these are popularly credited with curative properties against rattlesnake bites. *E. Lathyris* has locally escaped from cultivation, and is periodically brought forward as a much-needed remedy for the troublesome "gopher" *Thomomys umbrinus*, which, in sandy lands particularly, it really seems to abate materially, probably through the poisonous properties of its pleasant-tasting seeds.

The most universally diffused weedy member of the order, however, is the *Eremocarpus setigerus*, a broad-leaved, hirsute, spreading annual, commonly known under the name of Turkey weed. While it prefers light sandy soils, and is, therefore, more especially at home in the San Joaquin Valley, it is also found throughout the Sacramento Valley and within the Coast ranges, from Mendocino County on the north to San Diego on the south, and on the valley and mesa lands of the interior; it does not even omit the Mojave Desert, but there changes its dichotomous spreading habit to an erect one, and appears in large patches densely crowded with almost unbranched stems, as much as three feet in height; suggesting the use of its strong and abundant fibre for industrial purposes. The extremely irritating nature of the dust arising from the dry stems when handled would alone probably prevent such use. The extreme resistance of the plant to drought enables it to survive almost any other annual vegetation; but the ease with which it is killed, even by a kick at the root-crown, renders it much less objectionable than most other "summer weeds."

Sisyrinchium bellum, the handsome blue "star grass," is apt to overrun moist but overstocked pastures, and is sometimes not easily subdued.

Oddly enough, one of the "California Lilies," the pale blue *Calochortus invenustus*, is a veritable weed in some of the warmer parts of the state, where it persists in grain-fields, though without material damage. A Zygadenus is charged with poisoning lambs and their hungry mothers in early spring in northern California and Oregon.

Of weedy Grasses, the troublesome Chess, *Bromus secalinus*, is found here and there, as an importation with seed grain or packing straw; but it utterly fails to gain a foothold as a weed. Its place is, however, very successfully occupied by the corresponding plant of Europe, the Darnel (*Lolium temulentum*), which not only holds in the cereal fields a place similar to that held by the Chess in the east, but is in addition charged with the same sin of transforming itself at will, in unfavorable seasons, into the very grain of which it has usurped the place—wheat, barley, oats or whatever the crop may happen to be. The echoes of warm discussions on this issue, both in journals and in agricultural clubs, have hardly yet subsided, and there remains many a staunch believer in the changeling supposed to perform such surprising feats. Not the least amusing feature of this discussion was that Darwin was repeatedly cited as supporting and proving the occurrence of such transformations.

Bromus mollis finds the climate much more congenial than does *B. secalinus*, and, with *B. sterilis*, may be classed as a weed grass, common on roadsides and in neglected fields. But it has attained a wide importance as a more or less welcome successor of the native grasses on natural pasture-grounds, so completely adapted to the Coast-range climates that it may be found waving on the slopes as thickly massed as though sown on purpose. Locally it has been thus used, and is likely to become more popular since it has been found to be effectual in driving out the most dangerous enemy among the grasses of both pastures and fields—namely, the *Hordeum murinum*, variously known as Squirrel-grass, Foxtail and Barley-grass. This undesirable immigrant, while affording early green pasture for a short time, becomes a fearful nuisance so soon as its long-awned ears are developed. The bristly awns, provided like the paleæ with retrorse serration, accompany the three-flowered spikelets to the end; and the latter, being sharp-pointed at the base, adhere to and penetrate almost anything in the way of woolen or cotton materials from the sheep's fleece to ladies' dresses; they work up the nostrils of cattle and the laborers' sleeves to the neck, and generally make themselves obnoxious to a degree not easily surpassed by any plant outside of the tropics. Although an annual, its extirpation has proved extremely difficult; and the advent of a natural enemy in the Soft Brome-grass is therefore most welcome.

The Wild Oat (*Avena fatua*) is so generally diffused even in the remote portions of the state that it is commonly considered indigenous, since it is mentioned by the early explorers as covering the hill-sides of the Coast ranges as well as of the Sierra foot-hills. While an unwelcome guest in the grain-fields, it is highly esteemed for hay, despite its hirsute glumes

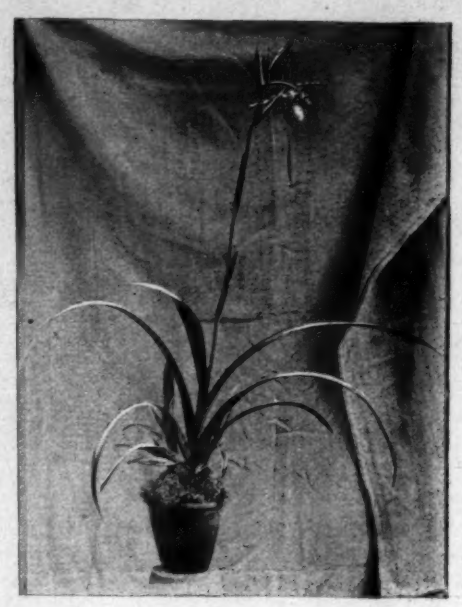

Fig 95.—Cypripedium reticulatum. The Plant.

that, when too ripe, sometimes give trouble in "choking" cattle not used to it.

Of the numerous Paniceous grasses that trouble the eastern farmer—the barn-yard grass, crab grass, feather grass, and the several Paspalums—not one seems to gain a permanent foothold in the fight for existence. Only the purposely introduced *P. halepense* (Johnson grass) has in some sandy soils proved an almost ineradicable pest. The *Setaria glauca*, however, is a terrible pest in the irrigated Alfalfa fields of the foot-hills, as stated above.

Of the various Poas only the *P. annua* can be counted as at all troublesome. The pestilent *P. Eragrostis* (*Eragrostis vulgaris*) does not maintain itself where introduced; and of the wild grasses all those comprehended under the general name of bunch grasses (mostly species of Festuca and Poa) not one troubles the farmer save by the difficulty with which the turned-up root-stocks decay under the arid climatic conditions.

The most widely troublesome grass is the native *Distichlis maritima* ("alkali grass"), which long maintains itself in "alkali" ground, particularly in the lighter soils, in which its long root-stocks penetrate to depths of several feet and propagate from any fragment of a few inches, especially in irrigated lands, resembling in this respect the Bermuda grass as known elsewhere. The latter, however, can, in California, do no more than hold its own where planted, except on the borders of ditches, for the reason that during the dry summer its runners are unable to cast root, thus preventing its spread.

The Eagle Fern, common on the northward slopes of the Coast ranges, maintains itself somewhat obstinately here, as it does in Oregon and Washington, but persistent cultivation for a few years overcomes it.

While the above enumeration seems, at first sight, to present the weed question as somewhat formidable in respect to the number of species concerned; yet, as matter of fact, "getting into the grass," that constant bugbear of the eastern farmer, confronts the California cultivator only in exceptional seasons; and with ordinary and intelligent care, adapted to the nature of the local weeds, he can usually rest from the weed war from June to November, or whenever the rains happen to set in. In the older-cultivated regions, in fact, the extirpation has frequently been so complete that, in the absence of the supply of vegetable matter usually furnished by plowing-in of weeds, the green manuring of the clean orchards and vineyards is being seriously taken in hand.

University of California. *E. W. Hilgard.*

Plant Notes.

Cypripedium reticulatum.

THIS very interesting plant, closely allied to the rare *C. Boissierianum*, although it has been in cultivation for many years, is seldom seen in flower. It has a remarkably robust habit of growth, although established plants have never yet attained such proportions as it reaches in its native home, deep in the interior of Peru, where its leaves often measure four feet in length, and the flower-scapes are three and four feet high. The flowers are large, and several are produced on a stem. They are of a pleasing green shade, reticulated with darker veins, and the finely fringed petals stand boldly out and measure five inches in length.

Mr. Hicks Arnold is the fortunate possessor of the plant figured on this page. It is growing in his collection in Eighty-fourth Street, in this city, in a moist and cool position. It has three growths; its leaves are two feet long, and it is thriving luxuriantly, although in a house containing a wide range of species, all of which seem to find their special requirements met, as they are in the best of health. *A. D.*

Cultural Department.

Sowing Seed.

THE last flowers of the Chrysanthemums are now hanging their heads. Even in a well-aired house weak necks are the rule with these plants so late in the year, and, naturally, this detracts much from their value, though the last of the blooms will come in well for bold Christmas decorations. The first of the early forced bulbs are now coming on, and the greenhouse is daily becoming more attractive. But I never thoroughly enjoy the greenhouse until the winter sets in in earnest and the seed-pans are brought out and filled; for propagation from seeds seems to me one of the most pleasurable parts of gardening. There is always the gentle excitement of securing seeds of promising plants, the studying of their possible peculiarities, the uncertainty of a good catch, and, this secured, the watching of the growth during the various stages to the mature plant, which is not always the most satisfactory part of the process.

From some observation I am inclined to believe that the successful grower from seed is born, not made. I have known a professional gardener to fail utterly with Beans, and I have known others for whom hardly a seed refused to germinate. Of course, the one did not think, but planted his seed in cold

Fig. 96.—Cypripedium reticulatum. The Flower.

earth, and gave them a good supply of water, and his imitators may be observed in many gardens in the early spring. The successful growers give their various seeds intelligent study, planting each in well-prepared earth, under proper conditions of warmth and moisture. While my friends appreciate my products, and do not decline to carry them away, they look askance at my seed-pans, which, from my point of view, is rather puzzling. Of course they all try a lot of seeds every spring, and usually imitate nature by sowing generously and reaping niggardly. The watering-pot generally does the business. Where there are no greenhouse facilities, altogether the best plan for the ordinary run of garden-seeds is to plant them in a frame in a warm corner, say, about the 15th of April in this latitude. Such a frame need be only four boards nailed together and covered with coarse sheeting, which, if oiled and inclined, so much the better. All but the most tender seeds will quickly germinate here, and need very little attention except a slight care in airing, and the annuals will be mostly ready to set out in the open as soon as the ground is warm. Any one who has had sowings in various places in the garden, each one of which must be protected from cats and hens, to say nothing of watching that they are kept properly moist, will appreciate a frame where they can be observed with a single glance. Of course, Poppies and such hardy annuals are better sown during the winter, mixing them with earth and scattering them over their destined beds.

There are many seeds of hardy plants which seem to do better under rather rough conditions, and seem to need frost or melting snow to start their germination. For seven or eight years I have had under observation the seeds of *Scilla Sibirica*, which are usually the first things to start in the garden under certain conditions. I have found that seedlings of these are never so abundant and so early as in those years when the trickle from melting snow reaches them. One year those in the border under these conditions germinated three months earlier than those in a cold frame, not quite free from frost but free from melting snow. While many seeds of hardy perennials will germinate as readily as those of annuals, it is not so as a rule, and the cold treatment (in a well-drained place, of course) will be found more frequently the successful one. For such seeds growers frequently expose the pans to snow and frost, and then bring them into a moderate temperature to sprout. But many of these seeds are so slow and irregular in their germination that in ordinary cases it is as well to leave them in the borders.

For pans of slow-germinating seeds I have had success in using burnt earth, which will stand for months without becoming mossy. This is prepared from clayey soil by heating to a red heat. These slow seeds not only weary all but the devoted gardener, but also the seedsman; and it is slight wonder that they are kept in stock by few dealers. The demand is small, and they would be the source of endless complaints from disappointed growers. The seedsman may have his special sins, but I do not find that selling bad seeds is usually one of them. Not only do they find it profitable to furnish the best seed, but the majority of these have longer vitality than is usually supposed. A large proportion of them will be good the second year at least, and many longer. But there are enough which start too slowly for careless planters—a few hardy perennials which need special care—and of these seedsmen are naturally cautious. Seeds of some plants will preserve their vitality for one, two, three or more years, and then all go off, while of other plants one could tell the age of the seed by counting the diminishing percentages in the seed-bed.

Elizabeth, N. J. *J. N. Gerard.*

Rose Notes.

At this time of the year many growers are tempted to give some extra heat in the Rose-houses in order to secure a larger number of flowers for the holiday season. In most cases, however, they regret such action afterward, because the plants so treated lose much vitality by the operation, and consequently fail to respond later in the season when another crop is expected. Preparation for the holidays is best made several weeks beforehand, so that a crop may be brought on in regular order without injurious forcing.

Careful handling in the matter of temperature is also fully half the battle in forcing Hybrid Perpetuals, for too much heat will give either blind wood or else miserable, deformed buds, while the splendid foliage and flowers produced by many of the market-growers are secured by a careful system of gradual forcing applied to strong, well-rested plants. During mild weather some ventilation will be needed, bearing in mind the fact that the sun's rays are less powerful now than they will be a month later, and therefore but little ventilation will be required to keep the temperature within bounds. Of course, direct draughts should always be avoided. Applications of liquid-manure should be made with caution at this time, too, especially to young plants of the present year's planting, though two-year-old plants in benches and Hybrids in pots will require some such stimulant from time to time.

Cuttings of Tea Roses may be put in at any time during the winter and spring, but, if started now, good stocky plants will be secured for next summer's planting. Only a moderate degree of bottom-heat is needed for Rose-cuttings, and firm young wood, from which a flower has recently been cut, is the best material.

The new Tea, Waban, will doubtless prove a valuable Rose, and certainly it is a beautiful one when well grown, though during the present season it does not seem to strike the popular fancy in some of the larger flower-markets of the country. Fashion seems to favor light pink or rose-pink shades in flowers rather than dark or reddish pink. Of its free-blooming qualities there seems no doubt, but the growth this year is weaker and the flowers smaller than those of its parent, Catherine Mermet. It is quite possible, however, that this condition is due to over-propagation, and that its vigor may be regained after one or two seasons' growth. At present, plants of Waban can, in most instances, be distinguished from those of Catherine Mermet, where the two are planted side by side, by its smaller leaves and thinner wood, but it is very probable that these characteristics may disappear, for some of the flowers of Waban exhibited by its introducer last season were as large as the best flowers of its parent.

A tendency to sport has been developed in Madame Hoste in at least one locality, the sport having been in the form of a fine yellow flower, so deep and distinct from the parent as to match well-colored Perle des Jardins at a little distance. This sport was propagated and tested this season, but I was recently informed by the grower that it proved a failure as a novelty, the young plants apparently having reverted to the original variety.

Souvenir d'un Ami is a handsome old Rose when well grown, though comparatively little used of late years since the larger pink Roses have been more fashionable, but a bench of this variety a hundred feet long and a perfect mass of dark green foliage and long, pointed buds, such as I saw recently, was enough to delight any Rose-grower. The soil in which these plants were growing was light and sandy, and it is quite likely that this had something to do with their unusual vigor.

Holmesburg, Pa. *W. H. Taplin.*

Better Begonias Wanted.

The most enthusiastic admirers of this new race of plants have not gone beyond the truth in praising the brilliancy of these flowers; a crimson, orange, yellow or white Begonia blossom, four or five inches in diameter, is certainly a remarkable production, when we consider from what it has been developed.

Yet I confess that they seem, to me, to leave much to be desired. I have grown, or seen, the best obtainable varieties sent out by Laing and others, and neither in the untried seedlings sold at a low price by the hundred, nor in the selected kinds which cost half a guinea each, do I find the admirable qualities possessed by the original species. The greater size of the flowers of most of the hybrids is not a merit sufficient to outweigh the entire want of grace which nearly all of these plants display, and their almost total lack of distinctness of habit is a grievous blemish.

Begonia Boliviensis was one of the first species introduced; its flowers consist of long, lanceolate segments and hang downward. No committee would now give it an award of merit, or even tolerate it upon an exhibition table, but as I saw it last August, growing in a partial shade, bearing abundant foliage as well as abundant blossoms, I thought it much more attractive than a number of hybrids of good quality growing near it.

No tuberous Begonia has finer foliage than *B. Pearcei*, whose leaves of bright green, veined with a much darker shade, have the soft appearance of velvet, and, with the numerous bright yellow flowers, make a plant of great beauty. *B. geranioides* is a species unlike any other, with its tall flower-stems, carrying a mass of snow-white blossoms with yellow stamens, arising from the fresh, green foliage. It comes into bloom later than many varieties and retains its beauty several weeks.

No species can exceed *B. Davisi* in brightness. Excellent for pot-culture or for the open ground, it forms a low, dense tuft of leaves, surmounted nearly all summer by its scarlet

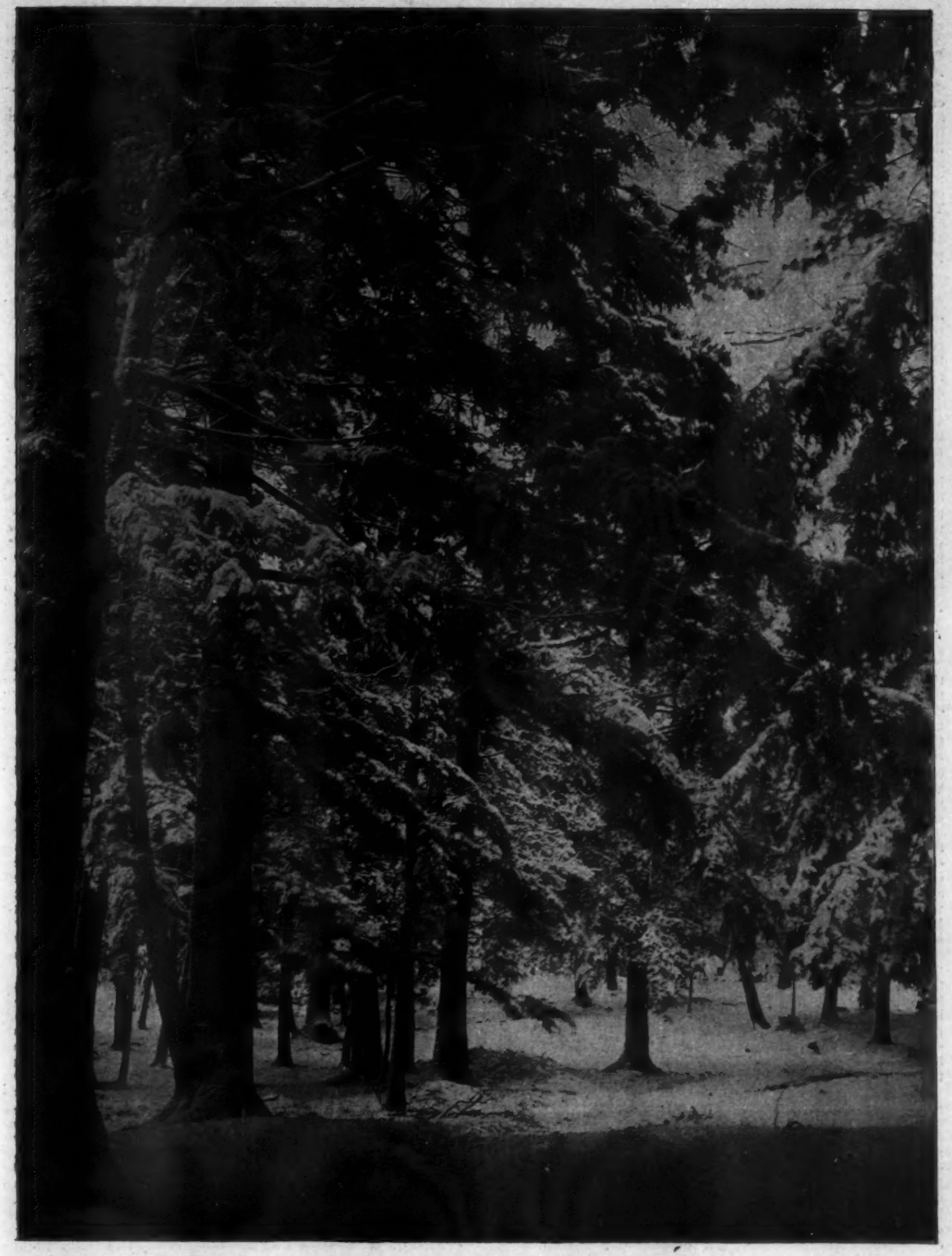

Fig. 97.—A Hemlock Grove in Winter.—See page 602.

flowers. A variety of this has flowers of a shade whose richness is not outshone by the Cardinal-flower. *B. discolor*, or *Evansiana*, has a beauty distinct from all others. Though it endures the sun very well, it is most attractive in the shade, where its large red-veined leaves assume a deep blue-green, and its panicles of pink flowers retain their beauty a long time. *B. octopetala*, on the contrary, does better in the sun. Its underground portion is different from what we find in other species, being a stout, creeping rhizome, which, in the course of a summer, will advance several inches, sending up leaves and flower-stalks throughout the season. This is a giant among Begonias, for its light green, circular leaves are sometimes a foot across—a yard around—and its flower-stalks, rising to the height of thirty inches, bear numerous white, round flowers, the first of which to open are three inches in diameter. This is the only species which ought to be planted before it shows signs of growth. M. Lemoine has hybridized this species with some bright-colored variety, but I have not seen the progeny.

Different from any of these is *B. martiana gracilis*. Its exceedingly numerous flowers are bright rose out-of-doors, pink under glass. If the tip be pinched out when the plant is six inches high, the side branches will be numerous, all stiffly upright, like those of a Lombardy Poplar. *B. Sutherlandii* is a very pretty species, especially if grown in a shady spot. It branches freely, forming a dense round bush, abundantly furnished with leaves of very elegant shape, and with buff or salmon flowers. It appears identical with *B. Natalensis*. *B. Dregii* (syn. *Caffra*) is also a plant of thick bushy form, but with fewer branches than the last mentioned, and with white clustered flowers. These two are useful for cutting, an unusual virtue in the tuberous group.

I have given a brief account of nine species, my design being to show that there is no need of confining ourselves to one form, and that a very ungraceful and awkward one, of tuberous Begonia. There is no reason why each of these types should not be developed (if development be desirable) without losing its distinct character. Begonias might thus be made worthy of a much wider admiration than they now excite.

Canton, Mass. *W. E. Endicott.*

Gall-worms Injuring the Roses.

COMPLAINTS have come to the Experiment Station of a shortness in the hot-house Rose-crop, and a recent visit to Madison, New Jersey, where Roses are grown in quantities for market, convinced me that the trouble was largely due to microscopic worms in the roots of the plants. The affected Rose-plants have a stunted, sickly appearance; they fail to send up strong shoots, and only develop short stems bearing pale leaves. The roots of such victims are much swollen in places, and these knots contain multitudes of minute worms akin to those sometimes found in vinegar, and called eel-worms. Such plants fail, of course, to produce good flowers, and are worse than worthless.

Like all root-pests, these eel-worms are difficult to reach with any remedy, and therefore preventive measures are the only ones that are promising. The worms flourish in a rich soil, and pass from the soil into the plant, and from one plant to another through the soil. It is, therefore, of great importance to have the soil used for potting plants or for the greenhouse-bed free from the worms, and, of course, none but clean plants should be used. The worms are easily killed by heat and cold, and therefore if the soil could be raised to a high temperature, the trouble would vanish. In like manner, soil that is frozen during the winter is less liable to contain the enemy than that which has been protected from the frost. In selecting soil it should, if possible, be that in which no garden-plants have been grown. The greatest trouble with the Rose-plant soil is probably the manure that is used in great abundance by the growers. It is likely that this manure is infested with the worms.

The experiment of raising Roses in a soil where stable-manure is replaced by a judicious mixture of commercial fertilizers is well worth trying. It has been shown, for example, during the present season, that Sweet-potatoes can be grown to great profit without the city manure, that has been the standard source of plant-food among truck-farmers. Also it has been demonstrated that Potatoes thus grown are less liable to the attacks of the various rots and decays so prevalent in many Sweet-potato localities. If the right mechanical consistency for the Roses can be obtained in connection with the commercial fertilizers, it is quite evident that the soil would be under better control and less liable to various infections.

Lime has been found inimical to the eel-worms, and therefore this substance may assist in keeping the plants healthy. The lime may be applied to the surface of the soil and carried down to the roots by the water that is daily applied. With Violets, which are much subject to the root-galls, it has been found that broken mortar, mixed with the soil, has been advantageous. Many of the substances that would be fatal to the worms also injure the tender roots of the Roses and cannot be used.

Those who have Rose-plants now dying from the worms should remove them all at once and burn them. The soil, of course, must be changed before another set of plants is grown, and the greatest care should be taken to reject every plant with root-galls, however small, when the beds are set. With these precautions and the use of lime, about all is done that is practicable, except, possibly, the use of commercial fertilizers in place of manure, but this practice needs to be proved profitable by actual trial among the Rose-growers. The fact that we have had warmer winters than usual during the past three years may have something to do with the overstock of eel-worms in the soil. A good freezing season may help to rid our outdoor soil of them. They are the plague of the garden and orchard in warmer climates, but here are most pestiferous indoors.

Rutgers College. *Byron D. Halsted.*

Notes from the Harvard Botanic Garden.

ARALIA SIEBOLDII.—This fine old plant has long been a familiar object in greenhouses, and its bold aspect is not likely to be forgotten by those who have seen large masses of the plant in the gardens of the milder portions of England and Ireland. As an outdoor plant it is much too tender for this climate, though it would probably thrive in favored locations from Washington southward. It is seen at its best when grown outside, where it develops into a bush from five to six feet high, and as many through, amply supplied with palmate, leathery, deep green, glossy leaves twelve inches across, on stout petioles of a similar length. It bears in summer numerous large clusters of small creamy white blossoms. In this part of the country, however, *A. Sieboldii* is essentially a greenhouse-plant, and with abundant space and liberal treatment it develops into a highly decorative specimen under glass. Where greenhouse space is limited small young specimens are the most useful. These are usually raised from seeds sown in heat, or the young plants obtained by cuttings from the half-ripened stems. Seedlings, however, make the most attractive specimens; but the seeds are not always easy to obtain. When grown to a single stem from one to three feet in height and furnished to the ground, few pot-plants of such simple requirements are more elegant. Repotting is not a frequent necessity, unless it is desirable to increase the size of a specimen. Pot-bound plants are easily kept healthy by the occasional use of weak liquid-manure, but the soil should never become soddened nor thoroughly dry. *A. Sieboldii* is an admirable plant for the dwelling-house, the thick texture and close surface of the leaves enabling them to withstand the dry air of such situations. Such plants derive fresh strength from out-of-door exposure during the summer. *A. Sieboldii* is a native of Japan, and was first introduced to Europe in 1858. It is most generally known under the name given here or *A. Japonica*, but the botanists now call it *Fatsia Japonica*, Fatsi being the Japanese name of the plant. There are two distinct varieties of the species: Variegata, with leaves bearing conspicuous blotches of white, and Aurea, which has a yellow variegation.

CLETHRA ARBOREA.—The Madeiran Clethra, or Lily-of-the-Valley-tree, ranks high among shrubs for the decoration of large conservatories. In lofty buildings dwarf plants can only be used as a fringe to the main groups of large specimens. Big, handsome plants, which need little garniture, are therefore a necessity in many gardens, and *C. arborea* is one that may be depended on for a good appearance. *C. arborea* was introduced to Kew in 1784 by Mr. Frederick Masson, and was formerly very popular in Europe. A half-dozen degrees of frost will not seriously inconvenience it, but the rigorous winters in this part of the country are much too severe for it. However, a well-lighted and airy house which excludes frost affords all necessary winter protection, and in summer a fully exposed position on the lawn will tend to ripen the new growth and produce abundant bloom. The pale green, oblong leaves of the plant are freely disposed around numerous branches, which terminate with large, slightly drooping, paniculate racemes of pure white fragrant blossoms. The inflorescence bears a striking resemblance to a spreading cluster of Lily-of-

the-Valley racemes; hence the popular name. Late summer or early autumn is the flowering season, but it may be retarded and prolonged for a considerable space of time by shading from sunshine. *C. arborea* does not flower freely unless the roots are well confined, and it can be induced to bloom when comparatively small by attention to this peculiarity. Of course, it must be supplied with food in the form of liquid-manure. The foliage soon loses its refreshing green if the soil about the roots is allowed to become dry, and it is the lovely contrast of perfect flowers and leaves which gives the plant its charm. Cuttings of firm young wood root easily in heat.

PHORMIUM TENAX.—This plant, well known as New Zealand Flax, deserves a place among fine-leaved greenhouse plants. It is without stem, and the straight leaves, bright green above and glaucous on the under side, from five to six feet long and two or three inches wide, appear in fascicles, radiating distichously from a common centre like the ribs of an extended fan. The branched scape, bearing insignificant yellow liliaceous flowers, is developed in summer, and exceeds the leaves in length by about two or three feet. The foliage, however, is the most attractive feature of the plant, and especially is this true of the variegated variety. In the latter broad stripes of yellow and white intermingle with the green of the leaves, giving the plant a very pleasing appearance against a dark background. There are several other forms of *P. tenax*, but the species and this variety are perhaps the best for general purposes. Both plants are very easily cultivated, and succeed well in any house from which frost is excluded in winter. In summer they thrive luxuriantly planted out in the garden, but they must be taken up early in autumn. The species makes the most vigorous growth in a rich sandy loam, but soil of a comparatively poor character should be used for the variety, by reason of its inclination to revert to the original green color. A cellar frost-proof and fairly light will answer for the storage of these plants in winter where there is no greenhouse. They are quite at home in porches and entrances at any season of the year, and when grown as house-plants they need no better position. I once knew two specimens which had been grown mainly in a hall-way for fifteen years. One was green, the other variegated, and they occupied twelve-inch pots, without a single change throughout all that time. They were placed outside in front of the house a few weeks in summer, during which time they received frequent doses of liquid manure and a top-dressing of fresh soil. The remainder of the year they spent in the hall at the bottom of a dark mahogany staircase, where they always looked well. No plant except, perhaps, *Aspidistra lurida*, will survive more ill-usage than *P. tenax*. The leaves are stiff, tough as leather, and therefore not easily injured, and they are unusually slow to resent neglect in watering. *P. tenax* was introduced to Ireland by a Mr. Underwood from New Zealand in 1798. It is very common in New Zealand, and its fibre is used by the natives in the manufacture notably of cordage. Considering the interest now taken in Ramie and other fibre-yielding plants by Americans, it is a matter of some surprise that *P. tenax* has not been tried more largely. The fibre appears to be easily separated. In 1822 a company was organized for the purpose of cultivating this plant in Ireland for its fibre, but the project had to be abandoned on account of the slow growth made by the plant under the climate of that country.

Cambridge, Mass. *M. Barker.*

Calanthes.—The season of these useful and brilliant Orchids has come around again, and we are more pleased with them than ever. The various tints of coloring of *C. Veitchii* contrast finely with the white varieties of *C. vestita*, *C. rubra* and *C. occulata*. A few plants set in between good specimens of *Adiantum Farleyense* in the warm greenhouse have an excellent effect. They take the eye at once, and give the house a bright appearance while they last, which few other plants can surpass. For cut flowers these Orchids are among the best. Not many spikes of *C. Veitchii*, with fifty flowers and buds on each, with Asparagus plumosus, say, for green, are needed to make a centre-piece for a dinner-table that ought to please the most fastidious. Florists ought to find profit in growing Calanthes; they increase rapidly, are no more trouble than Roses; they come into flower mostly after Chrysanthemums have faded and gone, and would be valuable for the holiday trade. They require an even temperature when in growth of not less than sixty-five degrees at night and ten to fifteen degrees higher in the daytime. They grow best in a fibrous loam, with a little thoroughly decayed cow-manure and a sprinkle of sand to keep the mass porous. The pots should be half-filled with potsherds, for thorough drainage is essential. The plants will bear feeding with liquid-manure after the fleshy roots have penetrated all through the compost and the young bulbs begin to form. They must be shaded from bright sun, and the long flower-stems carefully kept down from the glass.

A hundred plants in bloom at once, with fifty flowers and buds on many of the stems, present a beautiful appearance, and such a display can be seen now in the conservatories of Mrs. J. W. Lasell in this town.

Whitinsville, Mass. *W. S.*

The Forest.

The Subjection of Torrents by Reforestation of Mountains.—III.

CORRECTIVE WORKS.

THESE may be considered as barriers, drains and rectifications of the bed.

The barriers, whether of dry masonry or of hydraulic mortar, of timber or of living wicker-work, all have, as an object, the enlargement of the section in such a manner as to ultimately permit the establishment of a fixed and definite bed, preventing all erosion, and giving a solid support to banks otherwise unstable. Their deposits may be used to build up the old bed, by forming a series of stairs across the channel, and thus reducing as much as possible the great first cost of dams. These secondary works, judiciously employed, may even be retained among the greater works which it will be necessary to maintain continually, and thus reduce the number of the latter. The dams of the first class, besides this principal function, have the effect (1) of breaking by the falls they produce the rapidity of the water-flow, and preventing a sudden concentration in the main channel or in the river to which the torrent is tributary, and (2) of holding back above them the coarse material which formerly was carried into the valley below.

In addition to important works of the first class constructed in the principal bed of a torrent, there are placed in all its branches a series of rough barriers of rip-rap, so that the whole upper basin is under control before a specific correction of the channel is undertaken below. The value of this method, both as regards economy and safety, has been sanctioned by nearly twenty years' experience.

The number of important works of the first order, their forms and their dimensions depend upon the special character of the torrent under consideration, and it sometimes happens that the most powerful torrents require fewer great engineering works than certain others of an inferior development.

So far as the rough barriers are concerned, experience has shown that in many cases they may be widely spaced, especially in those places where the deposits are of rocky material. In certain ravines the deposits have a slope of twenty-five to the hundred, now held in place by vegetation. The little wicker-work dams in the small ravines can only be employed where the slope is less than one to five. Covering the bed of the channel with branches, or even with trees, piled two or three meters thick, with the tops up-stream, has been substituted where the slope is steeper. This system, in use about eight years, has quickly furnished most valuable results in the immediate correction of gullies.

Drainage, cautiously tried at first, has assumed a great development during the past ten years, since its effects have proved so striking in some torrents. These drains are superficial and much ramified. They were first tried with the object of giving the waters from melting snows or torrential rains a rapid and immediate flow toward mains on the line of the greatest slope, but they proved of greater and more permanent value than their projectors had dreamed. The earth, formerly unstable, wherever a corrected bed had first made the base firm, was found quickly safe from saturation, and the forestation of the bank or of the slope could at once be proceeded with. Conclusive experiments have been made during the past few years over an area of about 5,000 acres, which are to-day dry and solid.

The practice of rectifying the beds of torrents after a preliminary treatment has been largely developed, especially where the transverse profile of the torrent presented a suitable width and the longitudinal profile a pitch not exceeding twelve or fifteen to one hundred. The treatment consists of ranging at the foot of the banks rocks which will ward off the current and thus form a good defense for the shore. The new bed once outlined thus, is fixed by means of rude walls of large blocks, tending to guide the waters in the desired direction and checking all erosion, whether lateral or longitudinal. This very economical method requires continued attention for a

number of years, for which a force of well-trained men is needed.

The extinction of a torrent once accomplished, the complete reforestation of the treacherous basin will have the result of transforming this once-destructive agent into a beneficial mountain brook. After this it will be possible to decide upon the works which it may be necessary to retain and keep in order. For the rest it will suffice to open a free passage for the water through their centre, and to take up the differences of level by a series of small rough sills extending across the new bed, while the alluvium will soon be covered and fixed by a vigorous forest-vegetation. In this way the torrents are reconstructed into clear and harmless mountain streams.

I shall now cite some examples of forests treated by the adopted method.

THE TORRENT OF BOURGET.

This torrent empties into the Ubaye just above Barcelonette. The crests of the mountain from which it flows rise to an altitude varying from 2,900 to 3,000 meters, while its foot has an altitude of only 1,200 meters. The first operations began in 1870 with the reforestation of all the stable lands of the basin by sowing and planting *Pinus Cembra* in the higher region—that is, above 2,400 meters of altitude; *Larix Europea* and *Pinus montana* in the middle region, between 1,700 and 2,400 meters, and finally of *P. Sylvestris* in the lower region, between 1,400 and 1,700 meters. Woody vegetation has now taken possession of all the basins formerly denuded, and the young forest which has been absolutely created is increasing from year to year.

The unstable lands have been fixed by a series of corrective operations begun in 1872. The source of the torrent is at an altitude of 2,936 meters, and the profile of its bed is divided into three well-marked sections. The upper section, the catch-basin of the torrent, is 2,100 meters long, with an average pitch of 54 to 100. In this section the rock is hard, and the banks relatively stable. The middle section, constituting the drainage channel, flows exclusively through Jurassic marls, where the torrent erodes at will, and causes most disastrous washes by undermining banks and starting land-slides from the principal slopes. The length of this section is 1,764 meters, and it has an average pitch of 26 to 100. The third section, formed by the cone of detritus, has a length of 1,283 meters. It is more nearly level, and has an average pitch of 9 to 100.

The principal works of correction have been confined to the second section. Altogether they required the construction of twenty dams of masonry varying from 3 to 8 meters high. The subjection of the Bourget has been assured for more than nine years by a young forest of 988 acres, which occupies the upper basin. This result has been attained in fourteen years.

Correspondence.

Botanical Exhibition of the Appalachian Club.

To the Editor of Garden and Forest:

Sir,—The Appalachian Mountain Club has just held in its rooms in Boston an exhibition of plants prepared as herbarium specimens. As such exhibitions are none too common, a short notice of it may be of general interest.

The specimens were all mounted, with the exception of a few cryptogams—Lichens and the like. As many as possible were displayed on the wall, but a great number had to remain in genus covers, owing to the unfortunate lack of available wall space. This insufficient space necessitated covering the walls almost from floor to ceiling in order to make even a partial display of the collection, and therefore fully one-third of the plants shown were so hopelessly "skied" that it was impossible to examine them except with an opera-glass. A botanical specimen is not like a picture, where distance often lends enchantment to the view. It needs to be examined closely, if at all.

Of three rooms occupied, one was devoted to a large collection of Ferns from various parts of the world; another was filled with a collection of plants from California, supplemented by a set of colored outline drawings, an excellent adjunct to an exhibition of this nature. In the third room was shown a miscellaneous collection of flowering plants, Mosses, Lichens, Hepaticæ and Algæ. Altogether, there was enough material to occupy for some time the attention of any one interested in botanical subjects, and many visitors availed themselves of the privilege here offered.

It may seem ungracious to be critical in regard to such an informal exhibition, and yet it may be of service to point out a few defects. Much pleasure and instruction can be gained from such exhibitions, while, as object-lessons, their value is beyond question. But, of course, the work must be carefully planned and carried out if these desirable results are fully achieved.

In this case the whole exhibition displayed a lack of system. Some attempt had been made to arrange the plants in different genera, especially among the Ferns. The whole result, however, gave the impression that a number of people had been working each on a different plan. The genera appeared and disappeared in a most provoking manner, and many an important genus seemed wholly unrepresented, unless, perhaps, in the regions near the ceiling or somewhere in the genus covers. Mixed with the general collection, but without any general plan, appeared several special collections that it was desired to keep together, and altogether it was difficult for an observer to find any special plant without assistance.

It may well be questioned whether a local exhibition of this kind should not give a local collection the place of prominence, and admit other plants only in the form of special collections, as seems to have been actually done in the case of the California plants. Visitors are likely to be more interested in the plants of their own part of the country than in stray specimens and insufficient collections from here, there and everywhere. A good general collection is much beyond the scope and attainment of any small exhibition of plants, and a poor one serves more to gratify idle curiosity than to give instruction. It would, therefore, seem better to have some definite purpose to accomplish, such as showing the flora of a special region, or special plants for some marked object. From this point of view, the exhibit of our poisonous species of Rhus (under glass), together with some of the plants most resembling them, was most commendable. The wonder is that some one did not also make a special exhibit of our plants poisonous to the taste.

Unfortunately, it must be said that some determinations were open to suspicion, some were questioned, in many cases there were no names at all, in many more no specific name was given, and in a few cases the common English name of the plant seems to have been thought sufficient. Such errors could be avoided by providing for a careful inspection of all plants contributed under the supervision of some one of recognized botanical standing.

Again, there was too much disregard of ordinary care in preparing and mounting the specimens. Many of the labels lacked neatness; different varieties of a plant were mounted upon the same sheet, and in some cases not only two or three different plants were mounted together, but a whole flower-garden with not even a label to guide the observer through its mazes.

In spite of these manifest short-comings every visitor must have been impressed with the great promise that this venture gives, and must have felt grateful for the perseverance shown by the club in its first attempt. The more undertakings of this kind we have the better. If properly conducted, they can do great good by arousing a healthful and practical interest in our native flora. May this exhibition, therefore, be but the beginning of many in the years to come.

Boston, Mass. *Edward L. Rand.*

The Acorn Crop near Chicago.

To the Editor of Garden and Forest:

Sir,—In the issue of Garden and Forest for October 21st information is requested about the acorn crop in different parts of the country. Having been closely studying the Oaks of this vicinity for some time, the fruit has received a good deal of attention on account of its importance in the determination of species. Hence any great change in its amount, and particularly any failure, would have been observed. But no failure has been noticed, though in the case of the Bur Oak, which is more immediately concerned, it has seemed less productive than usual the past season. Besides this, the forests are supplied with the White Oak, Swamp White Oak, Red Oak, Black Oak, Scarlet Oak, Yellow Chestnut Oak, Shingle Oak and a hybrid of the last with the Black, or Scarlet Oak, much like *Quercus Leana*. These are all of whose presence I am certain, or familiar with in this region. All have been carefully studied, and, with the exception of the last two species and the hybrid, are abundant or common, though the Red Oak and Swamp White Oak are more restricted in their habitat than the other common kinds, and not so generally met with. On all biennial-fruited Oaks the acorns were very abundant last fall, as they are nearly every year. The annual-fruited kinds have seemed to me more changeable and uncertain in

their crop, though I recall no complete failure in any of the common species.

A year ago a group of the Yellow Chestnut Oak (*Q. Muehlenbergii*) practically failed. The trees are small and occupy a limited area. Some of the leaves having been found to bear a strong resemblance to those of *Q. Prinus*, the acorns seemed necessary in order to be certain of the species, and very diligent search on every tree revealed but three or four, just enough to determine the point. The past season plenty of acorns were seen on several of the same trees, as was the case with some in another locality where I had not met with them before.

On some of the Scarlet Oaks the acorns have been exceptionally abundant. Small trees, developing from stool shoots ten to twenty feet high and standing in open places, were so covered with fruit as to suggest a different kind, and were doubtfully identified at first. The acorns were borne in bunches, being massed upon the crowded twigs and near the ends of the branches, and the specimens were sufficiently exceptional to merit a place in my herbarium with the descriptive note made at the time, "Remarkable for the number of their acorns." Small trees of their habit are very handsome, from their compact rounded top, glossy leaves deeply divided into narrow lobes, and fruit grouped in bunches.

Another fact relating to the acorn crop here deserves a passing notice. It is the large percentage injured or destroyed by the Nut-weevil. Fully fifty per cent. were tenanted by the grub or had been abandoned after the meat was eaten out. Having traversed a good many miles of Oak forest, more particularly to find out what might be reliable characteristics of *Q. tinctoria* and *Q. coccinea*, for their forms must either cross or blend imperceptibly, acorns were everywhere taken in hand and examined in various ways, so that the destruction was seen to be very general. The case was even worse with the Shingle Oak and the hybrid, fully three-fourths of the latter, gathered for planting, having to be rejected. Other kinds were not examined so carefully or extensively, but as far as they were observed they were very badly affected, the Red Oak, of the biennial-fruited species, evidently being the least injured. It shows what havoc the Nut-weevil could work with the profits of an acorn crop, if it should be taken as an economical product, as it may be where mast forms an article of food for domestic animals.

Englewood, Chicago, Ill. *E. J. Hill.*

Uncommon Varieties of Apples.

To the Editor of GARDEN AND FOREST:

Sir,—Some time ago one of your correspondents asked why farmers and orchardists insisted upon planting so few kinds of Apples to the neglect of other and, in some cases, better varieties, and urged planters of new orchards to get out of the old ruts and introduce a little new blood. Well, the trouble is not wholly with planters. As a matter of fact, it is extremely difficult to get trees of any except the old and approved sorts, for which, perforce, there is a steady demand, since a farmer must either take these or nothing.

For example, this fall I wanted to set out a little orchard of winter Apples, and, bearing in mind your correspondent's suggestion, I searched the "Fruit Garden" and the "American Fruit Culturist," the best authorities I know on the subject, for new kinds. One of those selected was Cogswell, a Connecticut fruit, which seemed exactly what I wanted. Then began a hunt through the catalogues, which I procured from half a dozen of the largest nurseries in the country. But not one of them sold Cogswell. Another Apple I wanted was Winesap, but one of the largest nurseries in western New York could only undertake to supply twenty-five trees. Bailey's Sweet was another kind which they could not furnish at all, although it was included in their catalogue. I have had the same experience with other varieties, and one evident reason, therefore, why we planters don't go outside of the old lists when selecting trees is, that the nurserymen have no other kinds to offer.

Another Apple I would like to try, principally for its color, is Arkansas Black, which is very highly commended in a recent report of the Agricultural Bureau; but I can find no trace of it in the catalogues at hand. The same is true of Princess Louise, which has been highly spoken of as a substitute for the Snow Apple.

By the way, can any of your readers state anything definite about the new Apple, Palouse?

New York. *N. D.*

Recent Publications.

Sharp Eyes: A Rambler's Calendar of Fifty-two Weeks among Insects, Birds and Flowers. By William Hamilton Gibson; Illustrated by the Author. New York: Harper & Brothers, 1892.

The quotation with which Mr. Gibson prefaces his book says: "In good soothe ye are all blinde except thy minde and eie do see in harmonie. . . . Verily, there be those who see not though they doe looke, who, having eies of great bowinge, yet walk abroad in staringe blindness." In the introductory chapter we find another quotation,

> We're made so that we love
> First, when we see them painted, things we have passed
> Perhaps a hundred times, nor cared to see,

and by these two borrowed statements the purpose and character of Mr. Gibson's volume are well explained. He has tried to put what his own sharp eyes have seen before his readers, rightly believing that in this way their own will be sharpened to their lasting future delight and improvement. The many little chapters which the book includes—one for each week throughout the year—were written, he explains, in reply to letters received during ten years or more, chiefly from young students of natural history who had been interested by his previously published works; and they were first printed in the pages of a young people's journal. Nevertheless, the book is not for young people only. It is for all those who are still young in knowledge of the world of nature, and it will be pleasant reading even for students of a more serious sort than Mr. Gibson professes himself to be. Following his pretty and suggestive calendar from year's end to end, even the practiced, sharp-eyed naturalist may find some facts that are new to him, or have been observed in a novel way; and if this is not the case, even so he may find pleasure in living a while outdoors at second-hand when corporeally cooped up in a city's streets.

A good deal of gentle sentiment is mingled with Mr. Gibson's recording of minute, evanescent or more obvious phenomena; but this, of course, increases the value of his book to beginners in the gentle art of attentive sauntering. The best results of a developed keenness of sight are a developed intelligence and a developed heart; and, showing how the sights of the outdoor world led him to pretty, tender, fanciful and sometimes poetic thoughts, Mr. Gibson will help to awaken a similar capacity in his readers. Natural history, in the true sense of the term, cannot, of course, be learned from such a book; but it should inspire one with a desire to learn something at least about some one branch of it, and even if this does not result, it cannot but increase the reader's sharpness of vision and consequently his daily pleasure in existence. Mr. Gibson has been wise in recognizing this as the character of the service which could be rendered with a scheme such as he adopted; he has been wise in not trying to cram his pleasant talks with scientific terms, or to dwell upon such interesting and beautiful sights as can be discovered only by a closeness of sustained observation amounting to strenuous study. He shows us such things as we all may see any day in the woods and fields, if we use, in a simple, natural and easy way, the eyes that nature has given us. Yet he has been equally wise in giving the scientific names of the plants and living creatures he mentions. The insertion of these names will not bother the most careless reader, while they will greatly help the reader who may desire to follow a subject further. For, it is hardly needful to explain, common names vary so much in different parts of the country that it is often hard to identify a plant by their aid alone.

"Sharp Eyes" is a large octavo, beautifully printed, prettily bound, and profusely illustrated with photogravure reproductions of wash-drawings in Mr. Gibson's well-known, graceful, delicate and charming if not very vigorous manner. It is a very attractive volume for a holiday gift; but it surpasses most books of this sort by having genuine value as a volume to read. Perhaps it will not often be read through from end to end. More likely it will be taken up now and again for the sake of two or three of its little chapters. But this merely means that the pleasure it gives will be more prolonged, and that its influence in sharpening the mind as well as the eyes will be all the greater for frequent renewal. In the city it will be a charming reminder of the country, and in the country a charming incentive to outdoor enjoyment.

Notes.

In the Philippine Islands, canary seed obtained from *Phalaris Canariensis* is ground and made into a most palatable bread, which is in common use among the people there.

A Cocoa-nut tree that weighs six tons is to be transported, it is said, from Honolulu to a public park in San Francisco.

In Ferguson's "Information Regarding Ceylon," it is stated that one of the Palms of the island, the so-called Palmyra Palm, can be used for five hundred different purposes.

A remarkable Orchid, says the *Revue Horticole*, could recently be seen at the château of M. Pauwells, at Bosterlaer. It was a plant of *Oncidium divaricatum* bearing a flower-stem ten feet in length and no less than 784 flowers.

The bark which annually scales off the thousands of Plane-trees in Paris is carefully collected and sold, at one franc for seventy-five pounds, to the manufacturers of colors and chemical products. When boiled, it also furnishes a very astringent decoction, which is useful in compresses on wounds, burns and chilblains, and even on the bites of venomous animals.

At his recent visit to Philadelphia, Mr. John Thorpe secured for the Columbian Exhibition the promise of some large specimen Palms from the collection of Mr. G. W. Childs, and also some rare specimen plants from Mrs. Baldwin. Some of the large Ferns and Palms in the park conservatory, which were placed there during the Centennial Exhibition, will also be forwarded to Chicago.

A late number of the *Gardeners' Chronicle* contains a full account of the Orchids to be found in the British branch of the United States Nurseries at Hextable, Swanley, Kent. The Cypripediums are accorded the place of honor, which they also hold in the collection of Messrs. Pitcher & Manda at Short Hills. A Chrysanthemum-house, one hundred feet long, was reported as making a gorgeous show, and the white Carnation, Lizzie McGowan, came in for special commendation.

The Linnean Club, of whose good work in securing a park for the town of Jamaica, Long Island, we have already spoken, has arranged for a course of six illustrated lectures on plants and vegetable life, to be given by Dr. Morong, of Columbia College, under the University extension plan. The lectures will begin in January, and they will be followed in the spring by lectures on some branch of practical horticulture. These lectures are open to the public at a nominal price, and it is hoped that they will stimulate the growth of a public sentiment favorable to the objects which the club was organized to promote.

We have received several letters from growers of Carnations in various parts of the country in relation to the rust which was referred to in our last number by Professor Halsted. In some cases sulphate of copper has been used with good results, but in other cases, where, perhaps, the solution was too strong, it ruined the plants. There seems to be a great difference in varieties as to susceptibility to the fungus. On some varieties the fungus has not yet appeared at all, although they are growing by the side of infected plants. In one letter the varieties Annie Webb and Florence are spoken as nearly rust-proof. It would be interesting to have a list of the varieties which seem to be the least easily affected. We hope to publish in an early issue some further particulars in regard to this disease.

"Few of our native trees," says a writer in *Meehan's Monthly*, "have odoriferous wood like the sandal-wood of the islands in the Pacific Ocean; but a few of the coniferæ of the Pacific Slope have sweet-scented woods. The fine church at Metlakatla, built by the civilized Indians of Alaska, is as fragrant as if incense were continually floating through the air, from the wood of the great Arbor-vitæ (*Thuja gigantea*), of which it is built. *Libocedrus decurrens*, found further south, is known as 'Incense Cedar,' from its fragrance. The Yellow Cypress (*Cupressus Nukæensis*) and the Monterey Cypress (*C. macrocarpa*) have also scented wood."

Writing of the great Banyan-tree in the Botanical Gardens at Calcutta, Bishop Hurst says, in his "Indika," that the central trunk is fifty-one feet in girth, and that many of the one hundred and seventy smaller trunks have reached considerable size. "The process of cultivating the tendency of the Banyan to multiply itself," he adds, "is highly interesting. A slender root-like shoot is thrown out from the lower side of one of the branches and grows rapidly downward. Its lower end terminates in a small tuft of delicate rootlets, ready to strike into the ground as soon as they reach it, but, at the same time, presenting a tempting morsel to any goat which may pass beneath the tree. For the double purpose of protecting from the goats the slender stem which is to develop into a large trunk in a few years, and also of encouraging its growth, it is encased in hollow bamboo and fastened to the ground. It very quickly finds its way down the dark little cavity in the bamboo, and when once it becomes rooted in the earth its career is fairly begun, and it becomes the one hundred and seventy-first trunk in the vast system called the Banyan-tree."

The tenth annual meeting of the American Forestry Association, to be held at Washington on the 29th and 30th of this month, promises to be one of especial interest. Papers will be read by Mr. B. E. Fernow, Chief of the Forestry Department; President Adams, of Cornell University; Gifford Pinchot, of New York, and J. D. W. French, of Massachusetts. There will be a special meeting in the afternoon of the first day, in which the Executive Committee on the Establishment of National Reservations will report, and the Secretary of the Interior and the Commissioner of the General Land Office will be present and take part in the discussion. The meeting also will be attended by Senators and Representatives who have expressed an interest in the matter. President Harrison has assured the friends of forestry that he will give the broadest construction to the law which authorizes him to set apart these reservations, but it is well known that the mere act of reservation will accomplish but little unless it can be followed by the establishment of some rational administration of the territory. It is therefore proposed to memorialize the President and recommend further reservations, and also to recommend further legislation for their future management.

"If we were to make a suggestion independent of the architectural merit of the various buildings," said a recent editorial note in the *American Architect and Building News*, referring to the constructions proposed for the World's Fair at Chicago, "it would be that the Horticultural Hall . . . would probably be the most useful of all as a permanent structure. Even now, all our large cities contain enthusiastic horticultural societies which hold frequent exhibitions in the largest halls they can hire, and find their exhibitions crowded with people." The great success of the recent Chrysanthemum show at the Madison Square was then described, and the writer continued: "In fact, all over the country, Rose shows, Chrysanthemum shows, fruit shows, Orchid shows, winter flower shows, summer flower shows, spring bulb shows, Azalea shows and Rhododendron shows, and so on, follow each other in rapid succession, and the universal complaint made with regard to them is that no place can be found large enough to show all the good flowers that are offered, and accommodate, at the same time, the people who wish to see them. For Chicago, the Columbian Horticultural building would give exactly what is needed, and in exactly the right place, and it would add very little to the cost of the structure to make it permanent. It is to be remembered, also, that a building of this sort can be used for many other purposes besides exhibiting flowers."

Professor H. L. Bolley, of the North Dakota Experiment Station, has just issued an interesting bulletin on the Potato-scab, giving the details of experiments, which confirm his previous work and that of Professor Thaxter in Connecticut. There seems no longer room for doubt that the cause of the disease is a bacteroid fungus. It also appears that seed-tubers affected by this scab will produce a diseased crop, and that seed-tubers free from the diseased germs will produce a healthy product in any kind of soil, provided only that the soil itself is free from the germs. The germs of the disease can probably be killed without injuring the growth of the Potato, if the seed-tuber is treated with a solution of corrosive sublimate of the proper strength. But, after all, the disease-germs will remain in the ground, from crop to crop, for at least five years. Of course, it follows that when seed-tubers free from the disease are planted upon new ground the crop will be healthy, but this land will only remain free from disease so long as uncontaminated seed is planted there. Care also should be taken as to the kind of manure used, for the refuse from infested plants will certainly contaminate it, and implements which have been used in infested soil should also be thoroughly cleansed before they are used in the uncontaminated land. Professor Bolley has also discovered that Beet-roots have been attacked by a plant-parasite which is apparently identical with that which causes the scab of Potatoes. The affected Beets which were examined came to the station from various parts of the state, but in every instance, so far as could be ascertained, they had been planted on land where potatoes had been a previous crop. The disease on the Sugar Beets appears to be more extensive than it ever has been in the Potatoes. It seems also that the Swedish Turnip, Carrot and the roots of Cabbage are affected by the same disease. It now becomes of interest to know whether this scab of Potatoes is a disease common to all root-crops.

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